

Come explore, learn,
and change our world.

STEM&ME

A REGIONAL COMMITMENT TO SCIENCE, TECHNOLOGY, ENGINEERING, MATH & MEDICINE, ENERGY

Dear Educator and Student,

In a technologically-advancing world, our state and nation needs Science, Technology, Engineering, Mathematics, Medical, and Energy professionals of diverse racial and ethnic backgrounds who can contribute to the advancement of scientific innovations and technologies that improve lives.

As industry shifts in South Texas, we have observed new and exciting opportunities for our youth. This booklet, *STEM & ME*, is intended to encourage young people in South Texas to pursue not only careers in Science, Technology, Engineering, and Mathematics, but additionally respond to growth in the medical and energy fields in our area.

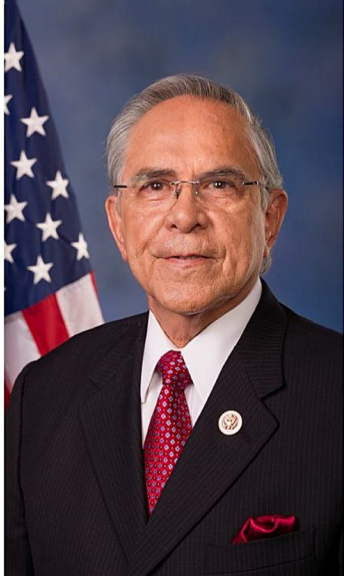
As your representative, I am pleased to join together with Region One Education Service Center, The University of Texas Rio Grande Valley, South Texas College, South Texas ISD, Pharr-San Juan-Alamo ISD, IDEA Public Schools and the Texas Valley Communities Foundation in bringing this special message to you! I am a firm believer that "Quality Education Impacts Outcome... Students Will Achieve Excellence!"

Throughout my tenure in Congress, I have been committed to broadening the participation of women and traditionally underrepresented groups in the STEM fields. As the demographics of Texas and the nation continue to shift and become increasingly diverse, I urge our students in South Texas to be college ready and college connected and to earn a college degree.

It is my hope that our region will continue to increase its success in preparing a new generation of scientists, innovators, medical professionals, and energy specialists for our state and nation. With this in mind, I encourage students in South Texas to consider using their knowledge, creativity and curiosity to become the scientists and innovators of tomorrow.



The Honorable Rubén Hinojosa (TX-15)
Member of Congress
1997-2017





STEM & ME

A Regional Commitment

In a world that is becoming increasingly complex, where success is driven not only by what you know, but by what you can do with what you know, it is more important than ever for youth to be equipped with the knowledge and skills to solve tough problems, gather and evaluate evidence, and make sense of information. These are the types of skills that students learn by studying Science, Technology, Engineering, and Mathematics—subjects collectively known as STEM.

STEM education has changed traditional science and mathematics classrooms into student-led classrooms. A new concept introduced by Representative Rubén Hinojosa (D-15) to STEM is the addition of “medicine and energy” (ME), which addresses the changing landscape in the South Texas region with the addition of medical-focused high school campuses and the creation of The University of Texas Rio Grande Valley School of Medicine.

Just as the instructional focus has changed, the region known as the Rio Grande Valley of South Texas has evolved offering numerous opportunities for students to study and seek professions in STEM & ME related fields.

Located in the southernmost part of Texas, the region shares a border with northern Mexico. The vast region covers roughly 4,300 square miles and is home to a young and growing population of 1.3 million people with a median age of 29. Made up of four counties—Hidalgo, Cameron, Starr, and Willacy—the region is largely rural with a rich history of agriculture and manufacturing.

About 90 percent of the Rio Grande Valley's residents are of Hispanic or other Latino heritage and many are fluent in both Spanish and English.



Many families in South Texas are economically disadvantaged: 33 percent live in poverty compared to 14 percent of Texas as a whole. The region's median income of \$40,000 trails the state by \$12,000; however, the economy is improving.

For years, the Rio Grande Valley has had one of the fastest growing economies in the state and nation. Jobs in education, health services, information technology, energy, and retail, to name a few, have provided new opportunities for residents. With the increasing number of job opportunities, demand for residents to complete high school and college with an acquired college credential and/or job skill has also grown.

Through innovative programs and partnerships, students now have the opportunity to earn these credentials as early as their high school graduation, increasing the likelihood of them completing a four-year degree and being competitive members of society.

Region One Education Service Center Demographics

School Districts: 37

Charter School Districts: 10

Counties: 7 (serving 9,771 square miles)

Student Population: 427,671

4-Year Graduation Rate: 88.2% for the Class of 2015 vs the State of Texas 89.0%

Advance Course/Dual Credit Course Completion (grades 11-12): 56.1% vs the State of Texas 54.5%

(2006 TAPR)







Science

Opening Doors to the Healthcare Industry

For students, science may sometimes seem like a collection of isolated and static facts found in a textbook; however, the knowledge generated is a powerful source used to develop new technologies to treat disease and improve the well-being of communities.

In South Texas, the push for young adults to pursue science degrees has increased greatly. With the expansion of the area's hospital district and healthcare services, college graduates with a science degree can obtain a management or administrative position in the fast-growing healthcare industry. Bachelor of Science degrees also provide a solid foundation to post-graduate degrees in the huge medical field or professional work in research laboratories and pharmacies.

According to the Bureau of Labor, employment of life, physical, and social science occupations is expected to grow seven percent, from 2014-2024, which will provide approximately 97,600 new jobs. The median annual wage for these occupations with a two-year or Bachelor's Degree is of \$62,160 compared to \$36,200 for all other occupations.





PARTNERING INSTITUTIONS

The University of Texas Rio Grande Valley



Hispanic Engineering, Science and Technology Week

Since its inception, the Hispanic Engineering, Science, and Technology (HESTEC) initiative has become a nationally recognized hallmark model for promoting STEM careers among young people of all backgrounds and ethnicities. The University of Texas Rio Grande Valley builds on the program's legacy of promoting STEM & ME education to further prepare the next generation of students who will be changing the world through STEM & ME.

The South Texas Region, like the rest of the country's scientific and economic stability will face continuous challenges without an increase in the number of students entering STEM & ME professions. From worker shortages, to the loss of high-paying jobs, and critical research and manufacturing resources, the lack of STEM & ME graduates will have a significant impact on our country. To address this issue, UTRGV remains committed to growing and expanding the reach of HESTEC to attract a larger number of students, teachers, parents, corporate and Congressional leaders to develop new programs and approaches to address the need for more STEM & ME workers and professionals at a regional, national and global level.

SCIENCE



Heriberto Reynoso

Robotics Scientist, Reybotics, Inc.

Rivera High School, Brownsville ISD

Brownsville, TX

Heriberto Reynoso began building robots at a young age. He turned his passion into a full-time job offering lessons in robotics to area school districts and developing Reybotics, where he designs robot kits for educational training and wholesale.

Reynoso is determined to impact K-12 education by incorporating robotics into everyday curriculum. He believes that if implemented effectively, robotics can transform education. Not only will it motivate and excite students through hands-on activities such as building and programming robots, but it will also aid in understanding and retention. One example is in math curriculum, "As a result [of robotics] students can visually see math concepts come to life. Most students know the concepts, but have absolutely no clue how to apply them to the real world," Reynoso said. "Robotics can streamline the process."

He has had offers from Google and other robotic and computer science firms from across the country, but he has made the decision to stay in the Rio Grande Valley and train young students about robotics to spark their interest in careers in science and technology – turning South Texas into a hub for robotics engineering.



Technology

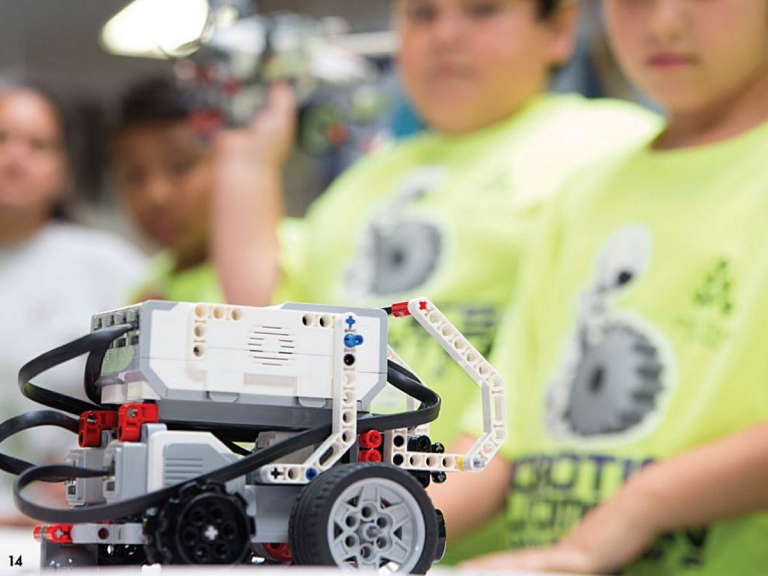
Creating a New Reality

The great thing about technology is that what once seemed only possible in science fiction novels or films has now become our reality. Technology's influence is found in every aspect of STEM & ME, making the advancements of what is capable in those fields limitless. That is most likely why employment of computer and information technology occupations is projected to grow 12 percent from 2014 to 2024 (adding an expected 488,500 jobs), faster than the average for all occupations according to the Bureau of Labor Statistics. This once primarily agricultural region is experiencing unprecedented transformational growth in higher education, medicine, science and energy, thanks in large part to the advancement of technology.

FACTS

In the Lower Rio Grande Valley, three of the top four target occupations are in technology: Web Developers, Computer User Support Specialists, and Computer Network Support Specialists. Interestingly enough, these high paying occupations support almost every industry in the region and only require a college certificate or a two-year associate college degree.





PARTNERING FOR SUCCESS



**SOUTH TEXAS
COLLEGE**

Founded in 1993, South Texas College serves as a catalyst for regional economic prosperity and social mobility. The college offers 119 degree and certificate programs, including four bachelor degrees in applied technology and applied science.

When STC offered its first bachelor degree in 2005, it did so with student success in mind. Now, as one of only three Texas community colleges accredited to offer bachelor degrees, STC continues to provide students with more options to earn accredited degrees that cement their first step toward a brighter future.

South Texas College currently offers three Bachelor's of Applied Technology (BAT) degrees, which means education is linked with hands-on, real world experience. Students learn theory and practice from the nation's top industry leaders and innovators, who weave professional experiences and firsthand knowledge into an academically rigorous curriculum.

DEGREES OFFERED

Technology Management (BAT-TMGT)

Computer and Information Technologies (BAT-CIT)

Medical and Health Services Management (BAT-MHSM)



Dr. Juan Carlos Juarez

*Optical System Engineer,
Johns Hopkins University
Applied Physics Laboratory*

J. B. Alexander High School, United ISD, Laredo , TX

Dr. Juarez, a native of Laredo, is an accomplished inventor and nationally recognized expert in laser communications, who currently serves as Principal Professional Staff at Johns Hopkins University Applied Physics Laboratory. It is through this position that Dr. Juarez helps develop critical technologies for next generation fiber and free-space optical communication systems to better equip our nation's military and government agencies. Additionally, Dr. Juarez serves as Lead Engineer for Lasercomm where he leads a team of various engineers and helps develop complex prototype systems to showcase new capabilities.

TECHNOLOGY



Engineering

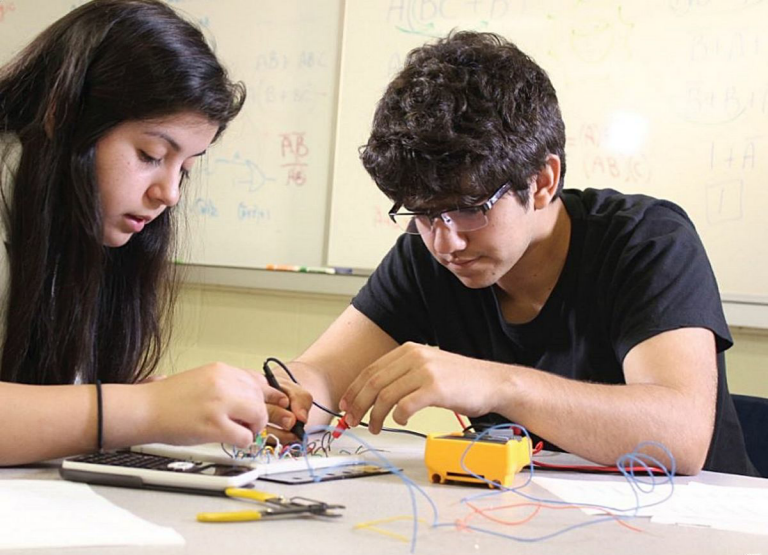
Building Our Future

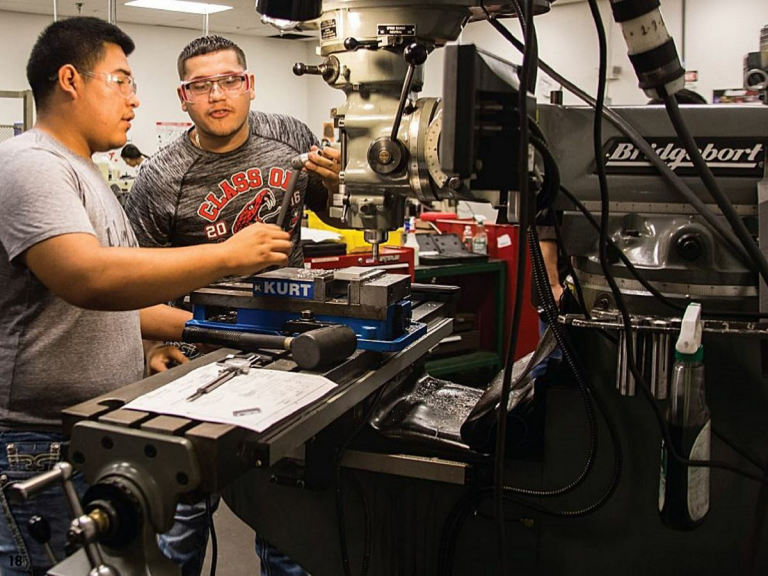
The Rio Grande Valley has quickly become a beacon of technological advances thanks to the increase in manufacturing facilities on both sides of the Texas/Mexico border. Most recently, the region was selected to host the world's first commercial orbital launch, SpaceX. This amazing facility will support space exploration to see if there is life on Mars.

Over the last 10 years, the growth of local jobs in this industry has more than doubled, and local higher education facilities such as The University of Texas Rio Grande Valley and Texas A&M University McAllen are projected to expand the types of degrees offered in the field of engineering.

Current top degrees in the region are still mechanical, civil and computer engineering, but the shift to aerospace, biomedical and chemical engineering is expected in the near future.

With the increase support and job growth of STEM & ME related fields, Rio Grande Valley school districts have also introduced the study of engineering earlier with South Texas College offering the Dual Enrollment Engineering Academy (DEEA) to interested students each year. Established in





2006, the academy gives students an opportunity to complete an Associate of Science Degree in Engineering by their high school graduation.

At school districts, such as Pharr-San Juan-Alamo ISD (PSJA), these academies have helped students jump start their career. Since 2012, twenty-one PSJA students completed the academy requirements and received the two-year credential from South Texas College. According to Texas Clearinghouse data, since 2008, 47 PSJA students have graduated with degrees in the field of Engineering from institutions of higher education within the State of Texas. "Never underestimate the influence of dreams and the influence of the human spirit." (Girls of Energy, energy.gov/girlsofenergy)

ENGINEERING PAYS OFF

According to the Bureau of Labor Statistics, unemployment rates for careers in the field is a low 3.8 percent, compared to 7.0 percent in other occupations. The annual mean wage for engineers is \$79,000. Employment of architecture and engineering occupations is projected to grow 3 percent from 2014 to 2024, adding about 67,200 new jobs. The growth rate is slower than the average for all occupations, in part, because several drafting and technician occupations in the group are projected to decline from 2014 to 2024 as improvements in technology, such as design software and surveying equipment, make workers more productive, according to the bureau.

FACTS

- Annual mean wage of an Engineering professional is \$79,000
- Annual mean wage for all other occupations \$45,790
- Unemployment rate for engineers - 3.8%
- Unemployment rate for all other occupations - 7.0%

Source: Bureau of Labor Statistics, 2012



Cecilia Corral

Co-Founder/Vice President

Caremessage.com

PSJA High School, San Juan, TX

Cecilia will go down in history as the first Pharr-San Juan-Alamo ISD student to graduate with both a high school diploma and an Associate Degree in Engineering. She studied engineering at Stanford University and worked on a variety of STEM Initiatives. Recognizing the need within her community to gain access to healthcare, Cecilia co-founded CareMessage, a health tech startup, to help solve this issue.

At CareMessage she leads all aspects of product development including the Engineering, Product, Design, Research and Clinical teams. CareMessage currently reaches over 1 million patients across the United States, with customers in over 30 states. Caremessage has raised over \$15 million dollars in the last few years.

ENGINEERING

Mathematics

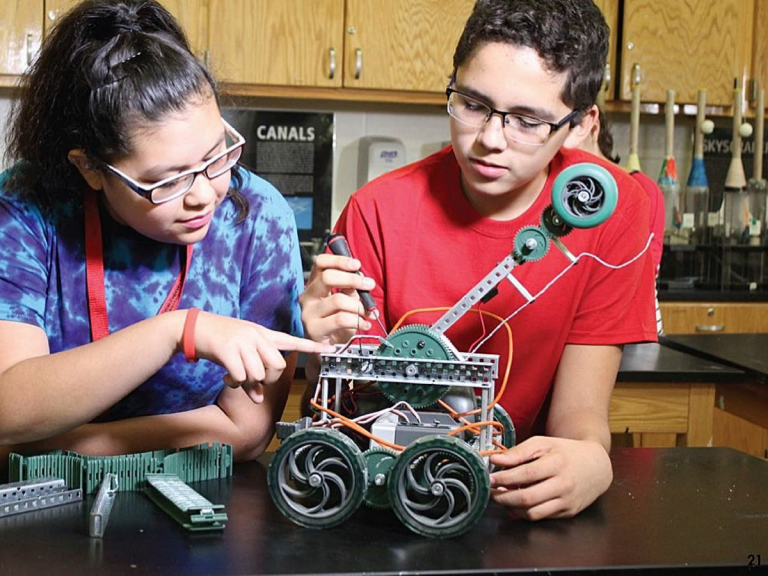
The Language of the Universe

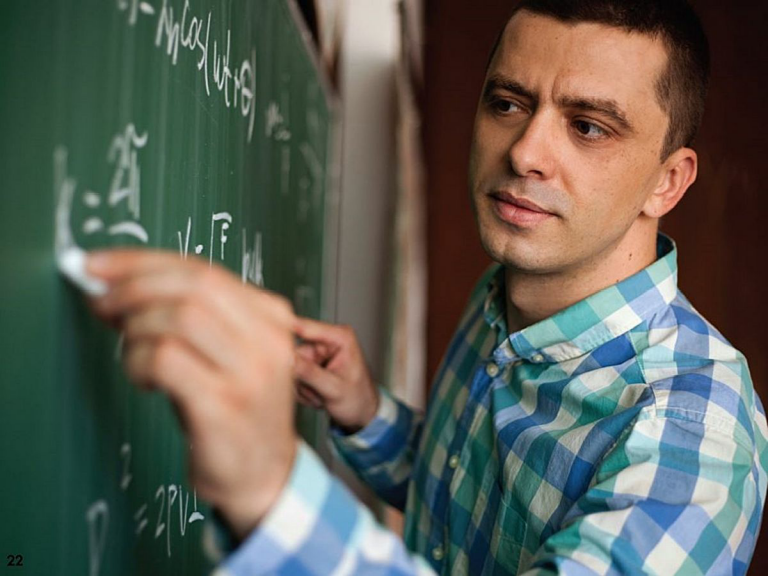
Mathematics is at the core of the STEM & ME initiative. Over the years, mathematics has become one of the most underrepresented careers, as jobs in Computer Systems, Software Developing and Biomedical Engineering have taken center stage. It is projected that the growth of jobs in Mathematics by 2020 will be at 16 percent with Biomedical Engineering soaring at 62 percent.

To ensure students move up from the middle of the pack in math, the U.S. Department of Education has taken specific measures the last several years to facilitate a cohesive national strategy and investment in STEM & ME, most importantly, Mathematics to support the development of future teachers in the field.

In South Texas, through a private/public collaborative between the Texas Graduate Center in Mercedes, Texas and Harvard Math for Teaching Graduate Program, mathematics teachers in the RGV are advancing their careers by delving into the fundamentals of the subject and examining different teaching styles to engage students.

Through this partnership, teachers receive a Masters of Liberal Arts in Mathematics from Harvard and return to their high school campus





ready to teach dual and concurrent enrollment coursework that will help students graduate from high school with college hours, up to an Associate Degree, saving them time and money and giving them a head start to complete a degree in mathematics or in another STEM & ME profession.

PROJECTED PERCENTAGE INCREASES IN STEM JOBS: 2010-2020

- All Occupations – 14%
- Mathematics – 16%
- Computer Systems Analysts – 22%
- Systems Software Developers – 32%
- Medical Scientists – 36%
- Biomedical Engineers – 62%

Source: US Department of Education

"I would love to thank PSJA, Texas Graduate Center (Mercedes, Texas), Region One GEAR UP, Texas Instruments, and everyone who supported me through this journey. I can honestly say that I couldn't have done this without them. I am forever grateful and appreciate everything everyone has done for me."

Juan Barrera, Math Teacher, PSJA ISD/Harvard Graduate



Christopher Chapa

Neuromodulation Mechanical Test Engineer
Medtronic SHPE Corporate Internal VP
IDEA College Preparatory, IDEA Public Schools
Rio Grande Valley, TX

During his time at Cornell University, Christopher received the highest score as an undergraduate in the Abstract in Society of Hispanic Professional Engineers National Technical Poster Competition. His passion for Engineering helped him accomplish both his Bachelor's and Master's Degrees in Mechanical Engineering. He acted on that passion and became a math tutor at his alma mater, IDEA Public Schools, and an Information Technologies Technician and Educational Analyst Intern. He has been involved in Biomechanics Research and has worked on several publications for the Orthopedic Research Society and BONE. He is currently responsible for the development and implementation of clinically relevant test for use on Medtronic Neuromodulation. His responsibilities include Test Method Development and Validation, Equipment and Tooling Development.

MATHEMATICS



Medicine

Advancing Healthcare Needs in South Texas

Our lives revolve around the health professions. Aside from the life-altering times, professionals in the healthcare field also touch our lives in less obvious ways - aiding us in making healthier choices and finding treatments to improve our overall health and wellness. Health is at the core of all that we are.

It is no secret that healthcare in South Texas is in high-demand. Endemic conditions and a shortage of professionals in the area contribute to a growing need for employees - and, consequently, education - in the health professions. Healthcare in the Rio Grande Valley has evolved over the last couple of decades, as a result of increased financial resources and educational opportunities, advancements in technology, and a united front across this region to improve in this area.

Within the Rio Grande Valley, the climate has changed over the last 20 years, with improved healthcare and expanded career opportunities. In 1996, the region lacked the availability of medical education facilities; today, the region celebrates The University of Texas Rio Grande Valley (UTRGV) School of Medicine, as well as the availability of medically-focused educational programs in K-12.

The newly created Texas A&M University McAllen will include Biomedical Science and Veterinary Medicine programs.





FOCUS ON EDUCATION

Twenty years ago, there were gaps in the availability of education programs and medical training facilities within the Rio Grande Valley for those interested in pursuing careers in the health professions.

Today, opportunities for students in the South Texas Region to gain a medically-focused education begin early.

South Texas Independent School District's first vocational magnet school - South Texas High School for Health Professions, or Med High - opened in 1984, marking the beginning of the magnet school concept within the region. Today, several other medically-themed magnet programs exist within school districts throughout the Rio Grande Valley, giving high school students the chance to start exploring the healthcare and allied fields, developing skills, and through partnerships established with local healthcare facilities, experiencing firsthand what they are learning in the classroom. Certifications are also being earned, allowing students to gain a marketable edge and a key to more involved learning at the postsecondary level.

The UTRGV School of Medicine opened in the summer of 2016, bringing to the region a powerful resource for medically-focused higher learning. The availability of a medical school at home allows more local students the chance to pursue advanced degrees with support of family and friends close by. This local, state, and federal investment is one of the largest and most exciting quality of life improvements in South Texas.

Twenty out of the 55 students in the first cohort of the UTRGV Medical School have roots in the RGV.

PARTNERING FOR SUCCESS

Innovative Professional Nursing Education: Nursing Dual Enrollment Pilot

In order to address a growing need for highly qualified nurses in the region, an innovative partnership between South Texas College (STC), Pharr-San Juan-Alamo ISD (PSJA), Doctor's Hospital at Renaissance (DHR), and Region One Education Service Center (ESC) aimed at providing dual enrollment high school students with the opportunity to earn an Associate Degree in Nursing (ADN) was established.

Dual enrollment programs allow eligible high school students to enroll in college courses while attending high school. They are able to complete high school and college-level courses simultaneously. Through the dual enrollment nursing program, PSJA ISD high school sophomores interested in the nursing field were targeted to take college courses that can be applied toward an ADN upon high school graduation. This effort, which has been widely acknowledged as the first of its kind in the nation, was approved as a pilot by the Texas Board of Nursing on July 23, 2015.

TOP 3 HEALTHCARE OCCUPATIONS

(BASED ON JOB OPENINGS PER YEAR - 2012-2022: RGV AND TEXAS)

McAllen - Edinburg - Mission - Pharr - Brownsville - Harlingen

- Registered Nurses
- Home Health Aides
- Licensed Practical & Licensed Vocational Nurses

Texas

- Registered Nurses
- Nursing Assistants
- Licensed Practical & Licensed Vocational Nurses

Source: The University of Texas System seekUT Dashboard (Texas Workforce Commission's Labor Market & Career Information Department Employment Projections for 2012-2022).



Amanda Peña

Clinical Pharmacist

Health Security Partners

**Sharyland High School, Sharyland ISD
Mission, TX**

Dr. Peña is a shining example of what occurs when an enthusiastic student grows into a professional who is committed to their community. Since earning a Doctor of Pharmacy from the University of Texas, Dr. Peña has been an active Professional Member of the Health Occupations Students of America (HOSA) SHS Chapter #7008. Dr. Peña provides one-on-one guidance and classroom presentations for Sharyland High School students pursuing health science professions. She granted a job shadowing opportunity to a high school health science teacher, allowing the teacher to have direct hands-on experience in a pharmacy setting, which provided relevance and best practices for the schools health science program. Additionally, Dr. Peña is a professional member of the Sharyland ISD Student Mentorship Program.

MEDICINE



Energy

Feeling the Change in the South Texas Region

As you drive past the miles and miles of what was once open farmland in the South Texas region, you will literally begin to see a change on the horizon. The Los Vientos 1A & 1B Wind Project by Wansek, consisting of 189 wind turbines, will transfer power generated by the overhead blades to electrical substations. Additionally, 102 wind turbines will be constructed in Hidalgo County. Turbines in Starr County by EDP Renewables will connect to the new Electric Transmission Texas line being built, eventually providing electricity directly to the Rio Grande Valley and other entities. The turbines loom overhead, gently swishing in the sky, signaling a change in the economic opportunities for the area as they generate new job prospects.

Wind Turbine Service Technician is listed by the Bureau of Labor Statistics as the fastest growing occupation between 2014-2024, with a growth rate of 108 percent, more than twice that of the next fastest growing occupation listed. While historically a male-dominated field, opportunities for women in the country's wind energy industry have increased, according to the American Wind Energy Association. The Women of Wind Energy, a non-profit group which promotes the advancement of women in wind energy, offers a number of scholarships designed to increase the number of women in the field.

Renewable energy appears to be a promising area.
According to a new report released by the





International Renewable Energy Agency (IRENA) — Renewable Energy and Jobs — Annual Review 2016 — more than 8.1 million people worldwide are now employed by the renewable energy industry — a five percent increase from last year.

Another area of job growth in the Energy industry is solar energy – in particular solar photovoltaic (PV) installers – which is expected to grow 24 percent from 2014-2024.

While there is projected job growth in this area, it is a relatively new system of home energy use, with the actual number of new jobs created being approximately 1,400. Many factors will account for the job growth in this field, including the increasing popularity of solar leasing plans for homeowners, government incentives, cost, and continued improvement of PV systems.

Locally, the Texas State Technical College campus in Harlingen, Texas, offers an Associates of Applied Science-Wind Energy Technology, as well as a Certificate Wind Energy Technician. With this, a student can pursue a career as a Wind Turbine Service Technician or a Wind Energy Project Manager. With additional education, workers can pursue careers in the wind energy industry as engineers, scientists, and logisticians. Visit energy.gov/girlsofenergy for more information.

FACTS

- \$52,000 annual median wage in Texas
- Texas employs the most wind turbine service technicians in the nation
- The total cost of an Associate of Applied Science (Wind Energy Technology) degree at Texas State Technical College-Harlingen campus is approximately \$9,330.

Financial aid opportunities such as Federal Pell Grants and student loans exist for students interested in pursuing a career in Energy.

ENERGY



Kim Wolff

Business Analyst, Noble Energy
South Texas Business,
Education, & Technology (BETA),
South Texas ISD

Her Interest In technology started as a student at South Texas ISD's Business, Education & Technology (BETA) campus, the 2006 graduate took as many Science, Math, and Technology courses as she could. Her passion in the field of technology led her to study Management of Information Systems (MIS) at Mays Business School at Texas A & M University where she graduated In 2009. She has worked In the male-dominated Oil & Gas Industry since then and has held various positions, including global application support lead, Information security coordinator, and business analyst. Currently, Kim works as a Business Analyst at Noble Energy In Houston, Texas.

STEM&ME

Deep South Texas will continue to increase partnerships among area school districts; institutions of higher education, businesses and the regional service center to ensure young adults have the opportunity to be competitive in the fields of Science, Technology, Engineering, Mathematics, Medicine and Energy (STEM & ME). It is the goal of the region to broaden the scope of possible careers in these fields for generations to come.

STEM & ME Programs Offered by the Following South Texas Institutions of Higher Education

Laredo Community College
South Texas College
Texas A&M University McAllen
Texas A&M International University
Texas State Technical College
University of Texas Rio Grande Valley

STEM & ME Collaboratively Designed by

Region One Education Service Center
Pharr-San Juan-Alamo ISD
South Texas ISD
South Texas College
The University of Texas Rio Grande Valley
IDEA Public Schools
Texas Valley Communities Foundation



Visit www.esc1.net/STEMandME for an online version of this booklet.